

Next Generation, UAV-Class Ozone Photometer, Phase I

Completed Technology Project (2009 - 2009)



Project Introduction

Physical Sciences Inc. proposes to develop a compact, rugged, rapid-response, autonomous sensor for in-situ monitoring of ambient O₃ from UAVs. Our innovation is to combine newly available UV light emitting diodes (LEDs) with miniaturized, low power, high sensitivity signal detection electronics to create a next generation, UAV-class, photometer for O₃. The advent of UV LEDs enables the development of a very compact and highly sensitive monitor for ambient O₃. An LED-based sensor has many advantages over currently available technologies and is highly suitable for deployment in UAVs. The Phase I program will demonstrate the feasibility of a breadboard sensor and create a detailed conceptual plan for a fieldable prototype. The TRL at the end of Phase I will be level 4. The Phase II program will fabricate a prototype that can be field demonstrated on an aircraft. The TRL at the end of Phase II will be level 6. Successful completion of Phases I and II will result in a rigorously validated prototype sensor that can monitor ambient O₃ with high speed and precision. The sensor architecture can be easily modified to measure other species. Using new mid-IR LEDs, the photometer can monitor trace gases such as CO₂ and CO.

Anticipated Benefits

The miniature (UV and mid-IR) LED-based sensor will serve as a platform for a suite of compact and low cost gas sensors that can address a variety of applications ranging from atmospheric research tools to carbon sequestration monitoring and verification, biomedical diagnostics (specifically breath analysis and operating room health monitoring), home or mobile toxic gas alarms, smart HVAC control, and as a total hydrocarbon sensor for environmental and process control applications. PSI anticipates working with several strategic marketing partners to address the range of potential commercial applications.



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

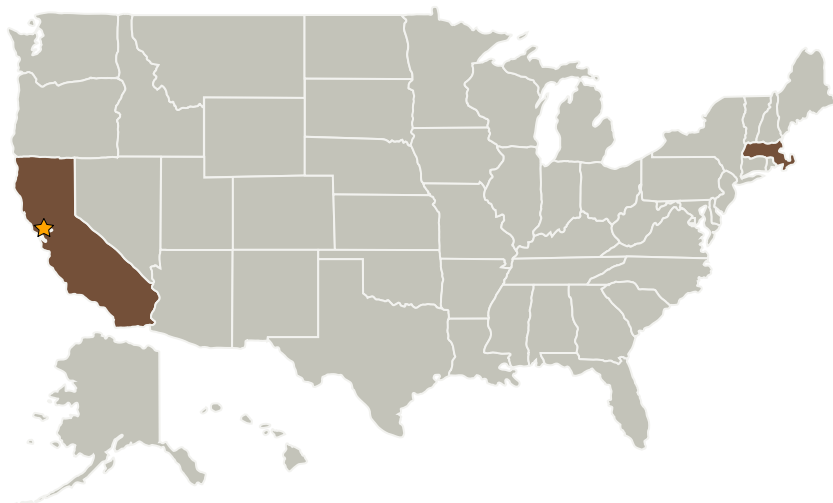
Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Physical Sciences, Inc.	Supporting Organization	Industry	Andover, Massachusetts

Primary U.S. Work Locations

California	Massachusetts
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Robert B Chatfield

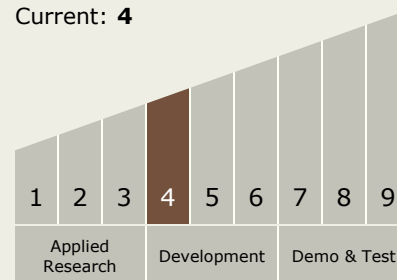
Principal Investigator:

David Sonnenfroh

Technology Maturity (TRL)

Start: 4

Current: 4



Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.1 Infrastructure Optimization
 - └ TX13.1.3 Commodity Recovery